
THE CrossFit JOURNAL

Improving the Clean

Many strong athletes eventually hit a wall when training the Olympic lifts. Bill Starr explains how to get back on track when your clean stalls and PRs cease to come.

By Bill Starr

June 2010



Susannah Dy/CrossFit Journal

The full clean is one of the very best exercises an aspiring athlete can add to his strength program. The main reason why it is so beneficial to any athlete in any sport is that it involves so many of the large muscle groups in a dynamic manner. When performed with even adequate form, the full clean works the legs, hips, back, shoulders and arms in a unique way.

1 of 10



Thomas Campitelli/CrossFit Journal

Cleans are obviously essential to Olympic weightlifting, but they also benefit athletes in a host of other sports.

Full cleans done with heavy weights require a great deal of intense concentration, and this forces the nervous system to work much harder than when doing more static and less complicated exercises. The process of having to think precisely about every facet of the lift taps deeply into the reserves of the nervous system. This is why so many athletes feel completely wasted after a heavy session of full cleans. Exhausting the nervous system is much more fatiguing than hitting the muscular system, which is why those just learning the lift must get plenty of rest and only attack the cleans once a week. They can be done more often, but the second or third sessions must be of a lighter nature.

The full clean is a high-skill exercise. It requires a great deal of coordination, timing, balance, quickness and total concentration in order to be successful with a max poundage. As an athlete learns the proper technique and attempts to perfect it, those athletic attributes become enhanced and can be utilized in other athletic endeavors.

Cleans are truly an ideal exercise for every athlete in every sport.

At both Johns Hopkins and the University of Hawaii, I had several baseball players who tried doing full cleans and discovered they had a natural aptitude for them. I realize not many strength coaches would bother to expose baseball players to this lift, but I knew of its value from my own experience. Once I added full cleans to my program when I first got interested in weight training, I was able to throw the ball much faster and hit the ball a lot harder. All the baseball players who took to cleans expressed that they received same benefits.

I've also introduced them to athletes playing a few sports that are not usually considered dependent on strength, such as tennis and golf. The results were the same as with the baseball players. In tennis, the ball suddenly started traveling faster, and in golf, drives were much longer. Cleans are truly an ideal exercise for every athlete in every sport. Plus, they're part of Olympic weightlifting, so anyone who has an interest in pursuing that noble sport should learn how to do them correctly.



Susannah Dy/CrossFit Journal

A heavy clean is an impressive feat of athleticism requiring strength, power, coordination and determination.

Whenever I suggest to an athlete that he should try full cleans, he invariably balks, stating that they're too complicated. Not true at all. In fact, it's a natural movement, and one I believe our distance ancestors had to do out of necessity. It's much easier to lift a heavy object by dipping under it than it is to pull the weight all the way to your shoulders while maintaining an erect position. That's why you can handle more weight in the full clean than you can doing a power clean once adequate form is established.

Prepare for Battle

Hopefully, you've read the article I did for the *CrossFit Journal* on full cleans ([Learning How to Do Full Cleans](#)) and have been practicing the Drill. If not, read the article and put the information to use. I will not go into the specifics again, although I do want to take the time to reiterate the importance of having enough flexibility in your shoulders and elbows so that you can do the lift smoothly without undue pain in these joints. If you attempt to do cleans without the necessary flexibility, you're not going to be as proficient and you're asking for an injury.

So let me once again inform you how to loosen your shoulders, elbows and wrists so that you can fix the bar across your frontal deltoids and do a front squat without any undue pain. I say "undue" because the learning stages will include some discomfort until all parts of your body become accustomed to the new form of stress. Over time this will pass, but only if you persist in enhancing and maintaining your shoulder flexibility.

Pre-teen, teen and female athletes have no problem obtaining the needed flexibility, and even most college-aged athletes achieve it in a short period of time—unless they have become enamored with the flat bench. Then the problem is more difficult to remedy. Excessive bench pressing tends to tighten the shoulders and reduces the range of motion of the arms. So if you've been doing lots of benches and are serious about learning how to do full cleans, either drop benches altogether or limit them to once every other week and keep the reps low—threes, twos and singles.

But I have found that unless an athlete has some sort of physical problem that doesn't allow him or her to do these stretching movements, flexibility can be achieved. Naturally, it comes easier to some than to others, yet that's true in just about everything in life. And I've also observed that those who had to work extra hard to gain the needed flexibility in their shoulders were more appreciative of what they had accomplished and always included lots of stretching in their workouts.

For anyone about to embark on the task of learning the full clean with the goal of moving some impressive poundages in the future, I recommend taping the wrists from the very beginning of the journey. Until your shoulders and elbows have loosened considerably, the wrists take the brunt of the stress. Wrists are small joints and are easily dinged, so it only makes sense to give them some extra protection. And I think it's smart to continue to wrap them as you become more proficient in the lift because no matter how good you become, you'll always have off days where misses outnumber the makes, and those misses play hell with your wrists. Trainers tape works best, and with practice you'll learn how to lay it on so that it supports your wrists firmly but is not so tight that it cuts off circulation.

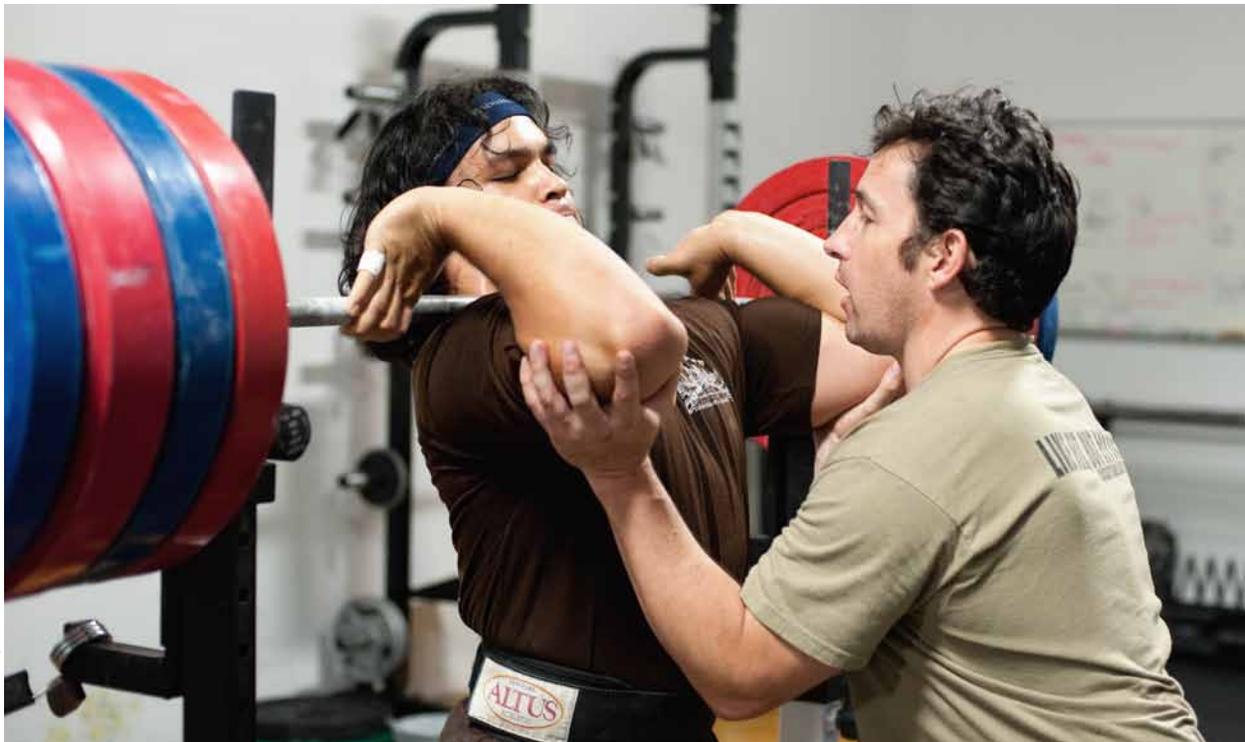
All you need to do is one very simple exercise to improve the flexibility in your wrists, elbows and shoulders. Lock a bar inside a power rack right at the height where you rack the weight while standing. Should you not have a power rack, load up a bar on a squat rack with more weight than you can move. With taped wrists, grip the bar firmly with one hand, then with your torso perfectly erect, elevate your elbow just as high as you can and hold it there for 8-10 seconds, all the while coaxing it a tad higher. Now do the same thing for your other arm.

Stretch out your shoulders throughout the day. I used to do this while waiting for a red light or while standing in line at a checkout counter.



Susannah Dy/CrossFit Journal

Stretching will allow your body to get in the right position to clean big weight. Make it a regular part of your routine.



A partner can help you go just a little bit further. Bill Starr recommends all athletes tape their wrists for protection in any Olympic workout.

If you're extremely tight, do 3 sets for each arm or until you feel your shoulders, elbows and wrists start to loosen. These are more effective if you have someone assist you in elevating your elbows, and for the next step in the process you must have help.

Grip the bar with both hands and lift both elbows up as high as possible. Your helper will apply pressure under your elbows to push them even higher. By exerting gentle pressure, your assistant will be able to extend your elbows a good deal higher than you can on your own. Again, hold them for 8-10 seconds at the end of each set. Should you still not feel comfortable on your first set of front squats or cleans, go back and stretch your shoulders out even more.

In addition, stretch out your shoulders throughout the day. I used to do this while waiting for a red light or while standing in line at a checkout counter. Sure, I got a number of strange looks, but I'm used to that. I emphasize this discipline because if your shoulders are not flexible enough, you're not going to be able to handle much weight in the clean. And if you did these movements while you

were learning the lift but have since stopped doing them because you feel your shoulders are loose enough, put them back into your routine. As you gain weight, which nearly every strength athlete does, the added muscle will often limit range of motion if you don't do something to prevent it.

High Pulls: Go Hard and Heavy

I'm assuming that you're using at least decent form and have advanced to the point where you're handling some testy poundages in the lift. You're gaining confidence in your technique. Your routine typically has you doing 6 sets of 3 twice a week. One time you go to max and the other you simply drill on form with moderate weights. Every so often, when everything is clicking, you go after a PR. All is coming up roses for a long time, then you hit a sticking point. While this is extremely frustrating to any motivated athlete, it's simply a part of the overall process of getting stronger. If it wasn't, every person who ever did full cleans would eventually handle 500-plus. Of course, we know this isn't the case. Those who have been successful in

knowing how to break through the inevitable sticking points and moving big numbers are few and far between. Why? It requires a hell of a lot of work, and most who say they really want to clean more aren't willing to put in the necessary effort.

Most who say they really want to clean more aren't willing to put in the necessary effort.

Whenever I see an athlete faltering on his cleans, I check his form for any glaring errors. If I find any problems, I have him drill with lighter weights until he corrects the problem, but in most cases I also add high pulls to his program. Use straps and only do 3 reps per set. The purpose behind doing high pulls is twofold: to allow the lifter to pull the

bar just as high as he can without having to be concerned with getting under the weight, and to overload the muscles utilized in the lift. Use straps. While you may not need them at first, you will sooner or later, so you might as well get used to them. It takes a while to get the hang of getting them snug on your wrists.

High pulls are one of the most difficult exercises I teach, although it would seem to be an easy movement to learn. After all, it's no more than a deadlift followed by a shrug. Piece of cake, right? Not really. The part that causes the most confusion is the transition from deadlift to shrug. It has to be done in smooth fashion with no hitching whatsoever, and this is easier said than done when the weights get heavy. And for high pulls to have a positive effect on full cleans, heavy poundages must be used. How heavy? Once you get the form down pat and can really lean into them, you should be using at least 75 more pounds on the high pulls than you can clean for three reps.

I like to plug these in right after a full-clean or power-clean session. In the beginning, 3 sets of 3 is about all anyone can handle, but as you get stronger, slowly add in more sets until you're doing 6 total.



Susannah Dy/CrossFit Journal

Straps are essential to the high pull. It takes some time to get used to them, but you'll need them eventually, so start using them now.

The objective is to pull the weight as high as you can, and there are a couple of gimmicks I used to facilitate more height. I hold a stick at the height I want the lifter to reach. If he succeeds and taps my stick, I lift it up a few inches, and so on until he finds his absolute limit with that amount of weight. This works because it's very hard to tell whether you are, indeed, pulling to absolute max on your own. I've had lifters swear they were giving it 100 percent, but when I did the stick thing, they were able to pull the bar as much as 6 inches higher than when they did high pulls on their own.

However, form continues to take priority over numbers. Always. If I see a break in technique. I have the lifter lower the amount of weight on the bar so that he can use perfect technique. If form is sloppy on high pulls, the strength gained isn't going to be useful in performing full cleans. In fact, it will have a negative influence on the lift.

**If form is sloppy on high pulls,
the strength gained isn't going
to be useful in performing
full cleans.**

The other gimmick comes from the fertile mind of Sid Henry, who coached me when I trained with him at the Dallas Y while attending SMU. He attached a small Christmas bell to the end of a piece of string. The other end of the string was wrapped around the outside of the bar. The length of the string was determined by how high the lifter wanted the bar to travel upward when he did high pulls. If the pull moved the bell off the floor, it tinkled and the lifter knew he had pulled high enough. If it didn't tinkle, that rep didn't count. This is even more Pavlovian than using a stick and is most useful for anyone who trains alone.

From the very first warm-up set to the final work sets, the athlete needs to pull the bar just as high as he can. For the lighter sets, this may mean that the bar climbs up over your head. Good. That's exactly what you want. As weight is added to the bar, it will not climb nearly as high, but



Susanah Dy/CrossFit Journal



Technique is important in a high pull. Athletes should try to keep the bar very close to the body, and the elbows should go high and outside, not back and down.



Bill Starr recommends doing clean deadlifts with sets of the smaller iron 25s to force the athlete to pull longer. If the smaller plates aren't available in your gym, you can create a similar effect by standing on bumpers.

you want to establish the feel of pulling to absolute max, because that's exactly what you must do to clean a heavy weight. In addition, pulling 100 percent activates many more muscles and attachments, and this, in turn, will help you get stronger in those groups.

You must pull aggressively, and the line of pull must be precise, close to your body from start to finish, with a nice pop at the top. At the conclusion of the pull, you need to be fully extended, high on your toes, with elbows up and out. This duplicates the final position for the clean, and you want to match this the best you can. Balance is a factor in high-pulling heavy weights correctly, and this, too, carries over to the full cleans. By overloading the muscles with high pulls, when you attempt a PR on the full clean, the new number will not be nearly as daunting because you've already had a feel of it moving in the exact same range of motion.

Fixing Form Breaks

High pulls and max attempts on the clean will help you identify the weak areas in your pull. This is an important step. The sooner you find out what area needs more work, the faster you will move to the next level. Two problems usually show up for those learning how to clean. The first is the most common: allowing the hips to climb upward

faster than the bar. This action carries the bar out of the proper line and prevents the lifter from pulling it high enough and with little snap at the finish.

Whenever I notice that a lifter is making this form break, I have him do deadlifts to strengthen his start. But not conventional deadlifts. Rather, I have him deadlift using 25-lb. plates rather than 45s. The smaller plates place the bar closer to the floor and force the lifter to set his hips much lower than when he does cleans or high pulls. From that disadvantaged position, the athlete must learn to lock his hips, glutes, and legs extra tight so they move upward at the same pace as the bar. I tell them to think about squeezing the bar off the floor and concentrating on holding the correct form. Some scoff when I have them to use the small plates, but that ends abruptly when they keep adding 25-pounders and do 6 sets, because squeezing off 345 for light, grueling reps is tough.

When the finish is relatively weak, I put athletes in a power rack and have them do heavy shrugs using the clean grip. Again, straps are in order. You may not need them for the low deadlifts because that is a static move, but shrugs are definitely dynamic and a great amount of weight can be handled. Start the shrugs from mid-thigh. Ease it off the pins to make certain you're pulling in the precise line

you're seeking, then explode into the movement. Just like I suggested for the high pulls, pull every set of shrugs just as high as you can. Once they figured out what I wanted them to do, all my Olympic lifters at Hopkins were able to hit the crossbar inside the power rack with their first warm-up set, and a few were able to do the same thing with the second at 225 lb. The Olympic lifts—snatch, clean and jerk—are all about height. You can never pull or jerk a bar too high.

However, the mechanics for the shrugs must be hairline perfect in order for the strength gained from doing that overloading movement to be utilized during the clean itself. To get that sweet snap at the finish, the line of pull has to be exact, your frontal deltoids need to be slightly out in front of the bar, and your elbows have to be up and out, not turned backward. Once your elbows turn back, you're no longer able to exert pressure on the bar and must depend on momentum.

The Olympic lifts are all about height. You can never pull or jerk a bar too high.

Do 5 sets of 5 on shrugs and go to absolute limit. The target I give to all my strength athletes for this lift is to handle the bar plus six 45s on each end for 5 reps. Obviously, the final few sets will not be jumping all that much, but if the lifter has continued to focus on pulling for all he's worth on every set, he'll reap the benefits. I always put shrugs in a program on Fridays, because when they're done correctly and with vigor, the athlete's traps are going to be quite sore the following day. If they aren't, he didn't work hard enough. Abused traps require a couple of rest days to recover.

Thanks, Barksy

As an athlete gets stronger in all parts of his pull and masters the technique on the full clean, the next problem most encounter has to do with timing at the top of the pull. When lesser poundages are used, timing isn't as critical. The lift can be saved with quickness even if there is a slight hesitation at the top. Not so with max attempts. Heavier weights don't hang around nearly as long, and

you still must extend fully to get the most out of the finish, so the move from pulling to diving under the bar has to be timed to the nanosecond. When I began to creep up on cleaning 400 lb., I encountered this problem. My keys needed to be altered because the action was different, much faster than before. I worked my cleans diligently but couldn't solve the riddle.



When fixing form with clean deadlifts on bumpers or with iron 25s, lifters should concentrate on making the hips rise at the same pace as the bar.

Then Bob Bednarski showed me an exercise that his coach, Joe Mills, had taught him: hang cleans done for three reps. The third rep was money. I had to learn to pull extra hard to get the bar to jump just a bit, then move like a shot under it because it didn't hang around very long. It took me several weeks to get the feel of this new movement, but once I did, I moved my numbers up to where I could handle 360 for a triple, and I developed the necessary timing needed to clean over 400.

What makes this exercise—which I dubbed “Barski cleans”—even tougher is the fact that you cannot use straps. You need to be able to dump the bar in case you miss the rack. Otherwise, the bar will crash down on you, and bad things often happen when that occurs. You must use the hook grip to lock onto the bar. I have small hands and wrists, so my grip is weak, but because of my small fingers, I'm able to hook a bar securely. The thing that makes Barski cleans work so well is that you can concentrate your full focus on that top pull and your timing to go under the bar. I've taught this to all of my Olympic lifters who were having difficulty with the move, and it helped every one of them once they discovered what they needed to do and started using heavy weights.

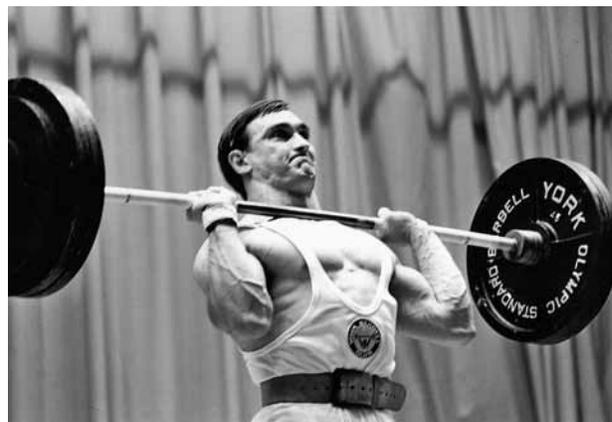
Tinkering around with light or moderate poundages doesn't feed the bulldog because it doesn't emulate what has to be done when handling heavy weights.

I teach them the following: “When the bar reaches mid-thigh, think about doing a Barski clean and the bar will fall right in the slot.” And it will—but, of course, you have to practice this high-skill move hard and heavy. Tinkering around with light or moderate poundages doesn't feed the bulldog because it doesn't emulate what has to be done when handling heavy weights.

The combination of shrugging heavy and doing Barski cleans will cure a sluggish rack in a short period of time.

A final point: you must strengthen your front squat considerably when the weights start to get demanding. The easier you can recover from a full clean, the easier it will be for you to jerk the weight, so attack front squats. The rule of thumb was that you needed to be able to front squat what you planned on cleaning and jerking for three reps. Also, make sure your back squats are done with the bar fixed high on your back and not low like powerlifters do. All the pulling and squatting exercises you include in your program must be done with full cleans in mind.

In future articles, I will present some ideas on improving your snatch and jerk, but for now, give your full attention to the full clean.



Jody Forster

About the Author

*Bill Starr coached at the 1968 Olympics in Mexico City, the 1970 World Olympic Weightlifting Championship in Columbus, Ohio, and the 1975 World Powerlifting Championships in Birmingham, England. He was selected as head coach of the 1969 team that competed in the Tournament of Americas in Mayaguez, Puerto Rico, where the United States won the team title, making him the first active lifter to be head coach of an international Olympic weightlifting team. Starr is the author of the books **The Strongest Shall Survive: Strength Training for Football** and **Defying Gravity**, which can be found at [The Aasgaard Company Bookstore](http://TheAasgaardCompanyBookstore.com).*